Department of Energy
Washington, DC 20585

JUL 25 2003

Mr. Karim Amrane
Air-Conditioning and Refrigeration Institute
4100 N. Fairfax Dr., Suite 200
Arlington, VA 22203

Dear Mr. Amrane:

This is a follow-up to our April 3, 2003, meeting regarding Single Packaged Vertical Air-Conditioners (SPVAC) and Heat Pumps (SPVHP). The Department of Energy (the Department, DOE or we) has reviewed ASHRAE/IESNA Standard 90.1-2001 Addendum d (Addendum d or the Addendum), which contains energy conservation standards and test procedures for these products (referred to collectively as Single Package Vertical Units or "SPVUs"). Addendum d was intended, we believe, to establish SPVACs and SPVHPs as new categories of heating, ventilation and air-conditioning (HVAC) equipment, and to establish test procedures and standards for these products separate from the product categories of which they were previously a part.

We have concluded that Addendum d does not accomplish what was intended. As further explained below, this is to advise you that our review indicates that the Department cannot adopt the standards and test procedures in Addendum d as Federal requirements.

As you know, if the efficiency level specified in ASHRAE /IESNA Standard 90.1 (Standard 90.1) is amended for a type of commercial air-conditioning and heat pump equipment covered under the Energy Policy and Conservation Act (EPCA), DOE is required to adopt the amended Standard 90.1 level unless it can show by clear and convincing evidence that a more stringent standard would save significant additional amounts of energy and is technologically feasible and economically justified. However, the Department is prohibited from prescribing any amended standard that increases the maximum allowable energy use, or decreases the minimum required energy efficiency, of a covered product. Similarly, changes in an industry test procedure prescribed by Standard 90.1 for such equipment also require DOE to amend the Federal test procedure for the equipment to be consistent with the industry test procedure, unless the amended industry test procedure would not meet certain test procedure requirements established under EPCA.

Addendum d provides minimum EER and COP levels for SPVAC and SPVHP products, describes the rating conditions for the EER and COP, specifies ARI Standard 390 (ARI 390) as the test procedure for SPVU products, and references a particular version of ARI 390, ARI 390-2001. In the course of its review of Addendum d, DOE has also examined ARI 390-2001.

The following are the reasons why the Department believes it cannot adopt as Federal requirements the standards and test procedures in Addendum d. First, taking into account the "Exclusions" in the Scope section of ARI 390, the Addendum appears to prescribe requirements for few if any of the products covered by EPCA. Second, assuming

nevertheless that Addendum d prescribes standards and test procedures for SPVUs that are covered by EPCA, we believe it does it in a way that is not in accord with the statutory scheme, because it disregards EPCA's definitions and classifications for air-conditioning products, and that is also unclear. And finally, to the extent it addresses products covered by EPCA, the Addendum appears to contain standards that, for some categories of products, are lower than the minimum efficiency levels currently required under EPCA. A more detailed discussion of these points follows.

1) Neither Addendum d itself nor any other provision of Standard 90.1 defines or describes SPVAC and SPVHP products, so the Department reviewed ARI 390-2001, which is referenced in Addendum d, to determine the nature of the products covered by the Addendum.[1] Section 3 of ARI 390-2001 provides definitions for SPVAC and SPVHP products. As indicated below, these definitions describe products that are covered by EPCA. But Section 2 of ARI 390-2001, which sets forth ARI 390's "Scope," states that "this standard does not apply" to products that are:

   a. packaged terminal air-conditioners and heat pumps as defined in ANSI/ARI Standard 310/380-1993, *Packaged Terminal Air-Conditioners and Heat Pumps*,
   b. water-to-air and brine-to-air heat pumps as defined in ISO 13256-1, *Water-Source Heat Pumps-Testing and Rating for Performance,*
   c. unitary air-conditioners and air-source unitary heat pumps as defined in ARI Standard 210/240-1994, *Unitary Air-Conditioning and Air-Source Heat Pump Equipment*, with capacities less than 65,000 Btu/h, and
   d. commercial and industrial unitary air-conditioners and heat pumps as defined in ARI Standard 340/360-2000, *Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment*, with capacities 65,000 Btu/h or greater.

   We believe these four exclusions encompass all or nearly all of the products that meet ARI 390's definitions for SPVAC and SPVHP.

   The significance of these exclusions from ARI 390 is two-fold. First, ARI 390 by its terms, and apparently Addendum d as well, cover no equipment that meets the definitions just mentioned from ARI 210/240, ARI 340/360, ARI 310/380, and ISO 13256-1. Consequently, ARI 390 and Addendum d cover little of the equipment that meets ARI 390's definitions of SPVAC and SPVHP. Second, and more importantly from DOE's perspective, Addendum d appears to have amended neither efficiency standards nor test procedures for any product covered by EPCA. The single package vertical equipment that EPCA covers corresponds almost exactly to the products that Section 2 of ARI 390 excludes from the scope of that Standard and from Addendum d. With the possible exception of SPVHPs that are water or evaporatively cooled heat pumps less than 65,000 Btu/h, any products to

[1] Addendum d's amendments to Table 6.2.1D of Standard 90.1 include a reference to ARI 390 as the test procedure for SPVACs and SPVHPs, and Addendum d also adds ARI 390-2001 to the "Normative References" listed in Section 12 of Standard 90.1.

which ARI 390 and Addendum d might apply are not covered by EPCA.[2] Therefore, because EPCA mandates that DOE evaluate amendments to Standard 90.1 for adoption as standards and test procedure for commercial products only if such amendments are for products covered by EPCA, Addendum d is not an amendment to Standard 90.1 that DOE is obligated to evaluate.

2) Notwithstanding its exclusion of a broad range of products from ARI 390, DOE believes Section 2 of the Standard may have been intended to provide merely that SPVACs and SPVHPs would no longer be covered by the other standards Section 2 references. Viewed in this light, and ignoring the language of the exclusions, Addendum d as proposed originally by ARI appears to be an effort to reclassify and prescribe new requirements for certain equipment currently covered under EPCA. This equipment is covered under the following EPCA product categories:

- Small commercial package air conditioning and heating equipment;
- Large commercial package air conditioning and heating equipment; and
- Packaged terminal air-conditioners and packaged terminal heat pumps.

The statute provides a separate definition for each of these covered product categories (along with definitions for other covered products such as commercial furnaces). Within each of these categories EPCA has distinct subcategories of equipment defined by the presence or absence of reverse cycle heating capability, the cooling capacity of the equipment, the type of condenser (water, air, or evaporatively cooled, or water source), and/or whether or not the condenser is located with the evaporator in a single package product or whether it is a remote component as in a split system air-conditioner. EPCA requires each of these subcategories of equipment to meet specific efficiency requirements.

Addendum d largely ignores the foregoing statutory scheme by referring to products (SPVAC and SPVHP) that in the broad definitions provided by ARI 390 appear to overlap many different product categories and subcategories within the statutory scheme. Addendum d provides a single set of efficiency standards and test procedures for all SPVACs and SPVHPs, without aligning these requirements with either the different product categories that SPVUs are contained within under EPCA, or the existing standards and test procedures under EPCA that Addendum d's provisions might replace. In addition, the range of products to which Addendum d applies is unclear. For example, although ARI 390's broad definitions of SPVAC and SPVU seem to include some water cooled and evaporatively cooled air-conditioners, the rating conditions referenced in Addendum d and Tables 1 and 2 of ARI 390-2001 suggest that the Addendum may cover only air cooled products. (We note that with the exception of Addendum d,

[2] Such water and evaporatively cooled SPVUs, if any, may be covered by ARI 390 and Addendum d because they do not appear to be unitary air-conditioners or heat pumps, as defined in ARI 210/240, which are excluded from ARI 390, and they are not within any of the other exclusions from ARI 390.

ASHRAE 90.1-2001 tables 6.2.1A-D use "Equipment Type" and not "Subcategory or Rating Condition" when defining products with different condenser types and with correspondingly different efficiency levels.)

The Department believes that it cannot consider adopting an amendment to Standard 90.1 unless the amendment is consistent with the statutory scheme and clearly delineates the products to which it applies.

3) Putting aside the exclusions from ARI 390, it appears that Addendum d is intended to apply to at least air cooled products. Therefore, we have attempted to compare Addendum d's efficiency levels with existing requirements for such products. Attachment 1 shows the existing EPCA air cooled product subcategories where there appears to be potential overlap between EPCA and Addendum d. In at least one instance, the proposed levels in Addendum d represent a definite lowering of existing commercial air-conditioning equipment manufacturing standards established under EPCA. In other instances, Addendum d provides for a lowering of some of the required efficiency standards (e.g., COP), but an increase of others (EER) for EPCA subcategories of covered products. Specifically, for a) central air-conditioners and heat pumps between 65,000 and 135,000 Btu/h cooling capacity, both the proposed EER and COP are clearly lower than the existing EPCA standard, and b) central air conditioners and heat pumps between 135,000 and 240,000 Btu/h cooling capacity, where although there is a rise in EER, the heating COP is clearly lower than the existing EPCA standard. We would also want to be satisfied that Addendum d's EER and COP levels are at or above the current EPCA efficiency levels for three-phase products below 65,000 Btu/h cooling capacity.

   There may also be an issue with packaged terminal air-conditioners and heat pumps (PTAC and PTHP). There appears to be some overlap between certain SPVAC/SPVHP product categories (illustrated by the fifth of the five groups of products identified in your presentation to us on April 3, 2003) and the EPCA definitions for PTAC and PTHP when the SPVAC/SPVHP products are unencased. The issue might arise because Addendum d's EER standards are lower than the levels currently required under EPCA for PTAC/HP products less than 8750 Btu/h cooling capacity, and because Addendum d's COP standard is lower than the levels currently required for PTHP products less than 7800 Btu/h cooling capacity. We recognize, however, that for other PTACs and PTHPs the Addendum d standards are higher than EPCA's existing PTAC/HP levels.

   We note that, to the extent Addendum d covers products that are not air cooled, such as for example water or evaporatively cooled air-conditioning products with a cooling capacity below 65,000 Btu/h, it appears that the Addendum d efficiency levels are lower than EPCA requirements.

DOE has several suggestions that might help to resolve the above concerns about Addendum d. One suggestion is to change the scope of ARI 390 and possibly other ARI test procedures so that products defined in ARI 390 as SPVACs and SPVHPs would be specifically excluded from other test and rating standards but not from ARI 390. Second, SPVAC and SPVHP could be defined with greater precision so as to avoid unintended

overlap with existing product categories under EPCA. Possibly, for example, these products might be defined as "air cooled." Another example might be to define SPVU products as "encased" to eliminate the overlap with PTAC/PTHP products. A third suggestion is to classify these products so that their classification would correspond to DOE's established statutory scheme. For example, SPVAC and SPVHP products could be subdivided into subcategories where each subcategory would correspond with one and only one existing EPCA product category. Another similar approach might be to create, within existing EPCA categories, new subcategories for SPVACs and SPVHPs. These new subcategories could have new required efficiency levels and test procedures, and would be clearly distinguished from the remainder of the products in the existing category. An example of this approach was the adoption of requirements for <17,000 Btu/h water source heat pumps within ASHRAE 90.1-1999. We assume that other steps could also contribute to resolution of our concerns about Addendum d.

We hope this letter provides guidance that may help in modifying both Standard 90.1-2001 as well as ARI 390, especially if you want to continue development of separate efficiency standards and test procedures for SPVAC and SPVHP product types. If ARI prefers SPVAC and SPVHP products to have a distinct categorization under EPCA, Addendum d would need to be clarified and take into account the existing statutory scheme, and the minimum efficiency level for each SPVAC or SPVHP category would have to at least meet the currently applicable efficiency requirements under EPCA. DOE would evaluate any such level to determine whether it is likely that clear and convincing evidence would show that a more stringent standard would save significant amounts of energy and be technologically feasible and economically justified. DOE would also need to evaluate the test procedure adopted by ASHRAE for SPVU products.

Finally, products, where there appears to be an overlap between EPCA air cooled and Addendum d, are subject to the EPCA 92 standards as shown in Attachment 1.

We would be pleased to meet with you to discuss the above points. If you would like to have such a meeting, please contact Maureen Murphy of my staff at 202-586-0598.

Sincerely,

Michael J. McCabe
Program Manager
Building Technologies Program
Energy Efficiency and Renewable Energy

Attachment

cc:
Claire Ramspeck
Manager of Standards
American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
1791 Tullie Circle
Atlanta, GA 30329-2305

Attachment 1. Overlap between Air Cooled SPVAC/SPVHP and other Air Cooled Commercial Equipment Product Categories: Air-Conditioners (AC) and Heat Pumps (HP)
(EPCA [as amended] Section 342 (a) (1), (2), and (3))

Equipment Category	Equipment Subcategory	EPCA Section	EPCA Date	Efficiency Levels[3]	
				EPCA 92	90.1-2001 Add. d Single Package Vertical
Small Commercial Packaged Air-Conditioning and Heating Equipment	AC/HP <65 kBtu/h Air-Cooled 3-Phase, Central-Single Package	Cooling Eff. 342(a)(1)(B) Heating Eff. 342(a)(1)(E)	1/1/94	SEER 9.7	EER 8.6
				HSPF 6.6	COP_{47F} 2.7
	AC/HP <65 kBtu/h Air-Cooled 1-Phase, Central-Single Package[4]		N.A.	N.A.	EER 8.6 COP_{47F} 2.7
	AC/HP 65-135 kBtu/h Air-Cooled Central	Cooling Eff. 342(a)(1)(C) Heating Eff. 342(a)(1)(F)	1/1/94	EER 8.9	EER 8.6
				COP_{47F} 3.0	COP_{47F} 2.7
Large Commercial Packaged Air-Conditioning and Heating Equipment	AC 135-240 kBtu/h Air-Cooled Central	Cooling Eff. 342(a)(2)(A)	1/1/95	EER 8.5	EER 8.6
	HP 135-240 kBtu/h Air-Cooled Central	Cooling Eff. 342(a)(2)(A) Heating Eff. 342(a)(2)(B)	1/1/95	EER 8.5	EER 8.6
				COP_{47F} 2.9	COP_{47F} 2.7
Packaged Terminal Air-Conditioners and Heat Pumps	PTAC/HP Air-Cooled < 8750 Btu/h cooling capacity	Cooling Eff. 342(a)(3)(A)	1/1/94	EER for products below 7000 Btu/hr is 8.88 and declines with increasing capacity between 7000 and 8750 Btu/h to a minimum of 8.6	EER 8.6
	PTAC/HP Air-Cooled > 8750 Btu/h cooling capacity	Cooling Eff. 342(a)(3)(A)	1/1/94	EER declines from 8.6 at 8750 to a minimum of 7.6 for 15000 Btu/h and larger	EER 8.6

[3] Shaded cells show known reductions in stringency within a product subcategory

[4] DOE has clarified that certain single phase central air-conditioners (i.e., SPVAC and SPVHP) are not consumer products covered under EPCA provisions for such products. Rather they are commercial air-conditioning products, regulated as commercial air-conditioners. However, currently there are no clear and distinct manufacturing efficiency standards for these single phase commercial air-conditioner products.

	PTHP Air-Cooled	Heating Eff. 342(a)(3)(B)	1/1/94	COP_{47F} for products below 7000 Btu/h is 2.72 and declines between 7000 and 7800 Btu/h to a minimum of 2.7	COP_{47F} 2.7
				COP_{47F} declines from 2.7 at 7800 to a minimum of 2.52 for products 15000 Btu/h and above	COP_{47F} 2.7